

## REMARKS

### ***Status of the claims***

Claims 1-12, 18-21, and 23-31 are currently under consideration.

Claims 1 and 18 are currently amended. Support for the claim 1 amendment can be found, for example at page 26, lines 5-9 of the specification. No new matter is entered by the amendments.

### ***Claim Objection***

In the Action claim 18 was objected to. The claim has been amended according to the Examiner's suggestion. Withdrawal of the rejection is respectfully requested.

### ***Rejections under 35 U.S.C. §103(a)***

Claims 1-4, 8-12, 18, 19, and 22-25 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Lu et al. (2001) *J. of Ahenzhou Institute of Technology* 22/2:1-7 ("Lu") in view of US Patent 3,832,472 of Rodgers et al. ("Rodgers"). Applicants respectfully traverse this rejection.

An obviousness rejection requires, *inter alia*, that cited references teach or suggest all elements of a claimed invention. Without conceding to the rejection but to further prosecution of the application, Applicants submit that claim 1 in present form recites in step (a) contacting an ungelatinized starch in grain (insoluble starch) with an exogenous maltogenic enzyme. As such, the source of the maltogenic enzyme is clarified. It is Applicant's position that Lu does not teach or suggest the claim element of contacting ungelatinized (insoluble) starch with an exogenous maltogenic and a starch liquefying enzyme or the claim element of conducting a method for producing isomalto-oligosaccharide from starch at a temperature less than or at the gelatinization temperature of the starch. Furthermore, the newly added reference, Rodgers, fails to cure this shortcoming.

Claim 1 recites:

a method for making an isomalto-oligosaccharide grain composition

said method comprising:

(a) contacting an ungelatinized starch in grain (insoluble starch) with an exogenous maltogenic enzyme and a starch liquefying enzyme to produce maltose;

(b) contacting said maltose with a transglucosidic enzyme, wherein said steps (a) and (b) occur at a temperature less than or at the gelatinization temperature of said starch; and

(c) obtaining a grain composition having an enzymatically produced isomalto-oligosaccharide, wherein said oligosaccharide is obtained from said grain.

The Examiner states that "Lu *et al.* teach enzymatic preparation of isomalto-oligosaccharide using wheat starch as raw material, where the starch slurry is liquefied by thermostable alpha-amylase 'SPEZYME Fred', saccharified by fungal alpha-amylase 'CLARASE L' and transglucosylated by 'Transglucosidase L-500.'" Office Action, page 3. In the Action it is further stated that "Lu *et al.* do not specifically indicate the steps of contacting grain ungelatinized starch with a maltogenic enzyme and a starch liquefying enzyme and to produce maltose (the first and second enzymes together), and contacting the maltose with a transglucosidase (the third enzyme) at the temperature less than or at a starch gelatinization temperature". Office Action page 3 last paragraph to page 4 first line, emphasis added. The Action later states that "Rodgers *et al.* teach wheat starch contains endogenous  $\beta$ -amylase (a maltogenic enzyme)." Office action page 4 lines 1-2. It is further stated in the Action that Rodgers and Lu combined teach "wheat starch slurry is treated with an endogenous  $\beta$ -amylase and a thermostable  $\alpha$ -amylase to liquefy the starch, which would produce maltose, and subsequently treating with transglucosidase at pH4.5-5.5 and 50-60°C (Table 1), which would produce isomalto-oligosaccharides." Office Action page 5 first full paragraph.

Thus, as acknowledged in the Action, Lu fails to teach the presently claimed element of "(a) contacting an ungelatinized starch in grain (insoluble starch) with an exogenous maltogenic enzyme and a starch liquefying enzyme to produce maltose" and

the claim element "wherein said steps (a) and (b) occur at a temperature less than or at the gelatinization temperature of said starch." As noted above, the former claim element (maltogenic enzyme) is explicitly noted as lacking in Lu and it is Applicant's position that Rodgers fails to cure the deficiency since the disclosed maltogenic enzyme in Rodgers is endogenous (as admitted in the Action).

Furthermore, the additional claim element "wherein said steps (a) and (b) occur at a temperature less than or at the gelatinization temperature of said starch" is not disclosed by either reference. While some temperature conditions and ranges are disclosed in the references, they fail to teach using a temperature less than or at the gelatinization temperature of any given starch in the context of contacting an ungelatinized starch in grain (insoluble starch) with an exogenous maltogenic enzyme and a starch liquefying enzyme to produce maltose as presently claimed.

An obviousness rejection also requires that cited references provide a reasonable expectation of success in practicing the claimed invention. As previously noted by Applicants, Lu specifically teaches that starch must be liquified before contact with maltogenic and transglucosidase enzymes. A person of skill in the art would not predict success practicing a method for production of isomalto-oligosaccharide without first liquefying the starch, based on the teaching of Lu.

As a prima facie case of obviousness has not been met for claim 1, withdrawal of the rejection is respectfully requested. Claims 2-12, 18-21, and 23-31 depend from claim 1 and therefore include each and every limitation of claim 1. It follows that the references either alone or in combination fail to support a prima facie case of obviousness for these claims as well.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a).

### CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 07-1048, referencing Docket No. GC791-3. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

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